DOCUMENT RESUME

ED 349 468 CE 062 040

TITLE	Workplace Applications of Basic Skills. National Workplace Literacy Project. Final Report.
INSTITUTION	Lutheran Family Services of Northern Colorado, Fort Collins.
SPONS AGENCY	Office of Vocational and Adult Education (ED), Washington, DC. National Workplace Literacy Program.
PUB DATE	90
CONTRACT	V198A00198
NOTE	56p.; Prepared in partnership with Hewlett-Packard, Fort Collins Site.
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	MF01/PC03 Plus Postage.
DESCRIPTORS	*Adult Basic Education; Adult Literacy; *Communication Skills; Corporate Education; Curriculum Development; *Job Skills; Language Skills; *Literacy Education; Needs Assessment; Program Development; Program Effectiveness; Program Evaluation; Program Implementation; Writing Skills
IDENTIFIERS	*Workplace Literacy

ABSTRACT

A project was designed to upgrade workplace basic skills for the purpose of promoting productivity, retrainability, job retention, and/or job advancement. It created a partnership among Hewlett Packard-Fort Collins Site, Lutheran Family Services, and Colorado State University's Division of Continuing Education. Skills needed for representative jobs were assessed through interviews, observations, and review of printed materials needed for that job. A curriculum that focused on oral and written communication, with components of learning how to learn, was designed. Exercises and examples used in training concerned everyday problems and challenges encountered on the manufacturing floor and aided transfer of skills learned to the job. Training design and methodology were targeted directly at the operator level and included additional time for modeling of skills taught, recognizing thinking processes needed to use skills, practice time, and participant feedback on application of skills to the job. Interactive courses were 28 hours long with two 2-hour follow-up sessions 30 and 90 days after course completion. Qualifying participants received a certificate of completion from Colorado State and Hewlett Packard. The multistrand evaluation proved impractical. (The final report is followed by a paper by Chris Kneeland and Sally Robinson containing a description of project activities, results and findings, and recommendations; initial brief; media release; job task analyses; and curriculum outline with learning objectives for 14 units.) (YLB)

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Workplace Applications of Basic Skills

U.S. Department of Education
National Workplace Literacy Project
in partnership with
Hewlett-Packard, Fort Collins Site
and
Lutheran Family Services of Northern Colorado
FY 1990 V198A00198

Final Report

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GOAL I : TO RESEARCH THE WORKPLACE LITERACY NEEDS OF THREE JOB FAMILIES AT HEWLETT PACKARD, FORT COLLINS SITE

ACTIVITIES AND RESULTS:

Goal I specifically dealt with needs assessment. However, prior to beginning the needs assessment process, the project team had to do some preliminary work. There had been key personnel changes between the time the grant was written and the time the grant was slated to start. Consequently, the grant idea had to be reintroduced to new personnel. The original HP contact person who signed off on the grant moved to a different department soon after the grant was awarded. The CCMO Production Manager was also new to his position. Given these changes, the project directors spent a great deal of time reintroducing the idea to Hewlett Packard management and finding a good fit for the program within the corporation.

The project directors began the process of needs assessment by working with the training department liaison to meet with staff from the Quality Department, the Career Development Department and the CCMO (Colorado Computer Manufacturing Organization) Production Department to explain the purpose and content of the grant. It was decided that the production department was the area that could benefit the most from basic skills training. However, HP CCMO was being heavily restructured as the grant was beginning. Some divisions were being moved out of the Fort Collins Site and consequently, the entire organization was faced with major changes.

In addition, a new technology was being introduced to the production process which necessitated a change over of more than 100 employees from one production process to another over a three to six month period.

The production manager agreed that the need for a basic skills program existed; however, because of the changes going on in the organization, he felt that the timing was off. The project directors met with him on several occasions to discuss how the work of the grant could be complimentary to other needs in the organization. The training department liaison worked with the project directors to present the grant information in a way which was consistent to other presentations at HP. The project directors felt that this played a significant part in the eventual acceptance of the grant. They continued to analyze how the work of the grant could meet the business needs of the organization and talked about the work of the grant in these terms. (See brief.)

The production manager eventually gave the go ahead to proceed with the project. In addition to the fact that the project directors were able to work within their culture, he also felt that the grant was a good opportunity to leverage a basic skills training program, even if it didn't fit exactly into their timeline.

Focusing Process

The first activity the project directors undertook to begin the needs assessment process was to work with personnel at all levels to identify the specific job and content areas the needs assessment and training would focus on. They conducted structured interviews with the production manager, department managers, supervisors and manufacturing operators. In addition, they used the needs assessment process to set the climate and begin to get buy-in from the total organization, which they felt was critical to the success of the project.

Part of the interviewing process was also an informational process to let HP employees know what workplace basic skills meant, including the expanded definition of basic skills included in "Workplace Basics: The Skills Employers Want" published by the American Society for Training and Development (1988). The interview process also served as a way for the project directors to get to know and understand the organization better. Knowing the organization better helped the project directors collect the functional context needed to write a functional context training curriculum and to better understand what the needs of the organization were so that they could be responsive to them in the program design.

After obtaining the support of the production manager, the next step was to talk with the general manager in each area of production. This group made the decision on which areas within production should be targeted for the grant project. The project directors worked with these managers to decide to focus the basic skills training on the majority of workers. In other words, they decided not to focus on ESL (which is less than 10% of the CCMO workforce), not to focus on the basic illiterates and not to focus on people who had better than average skills already. It was decided to focus on the middle approximately 60% of CCMO production workers who had basic traditional literacy skills, but who may not have the skills necessary to keep up with the changing workplace. (See Brief)

The group also decided to target specific skills that were required across jobs rather than all the skills required in three specific job families. It was felt that for the best climate and acceptance of the training, it was important that as many operators as possible be eligible to take the training. The project directors discovered through the insight of the training department personnel and management that they should look at all areas within CCMO so that no work areas felt left out or singled out.

Meetings with the work area supervisors were arranged. Supervisors were given the task of making the decision on which skills to include in the curriculum. The supervisors filled out a survey delineating which skills they felt were most critical to effective performance in the production area and which jobs would be changing the most in the future. They also identified representative jobs from each of their areas which could be made available for job task analysis. After several meetings and information sessions outlining the ASTD definition of basic skills, together with delivery of the results of the job task analyses, the supervisory group chose the content areas.

The skills that were targeted for a training program included oral and written communication, individual and group problem solving, learning how to learn and matching numbers.

The supervisory team prioritized the skills in the following way: 1)oral and written communication, 2) learning how to learn, 3) individual and group problem solving. The supervisory team felt that operators did in fact use the skill of matching numbers quite frequently on the job, but they felt that most employees had that skill.

This group also decided that the training should be mandatory rather than voluntary.

Meetings with the operators included getting feedback on what type of training accommodations they preferred (class size, rooms, times, etc), the type of training methods preferred (lecture, small group, interactive, etc.) and the qualifications to be looked for in a trainer.

A very positive aspect of the focusing process was that each level of employee was able to make some of the decisions for the project. The HP management's philosophy was that decisions should be pushed to the lowest level possible to promote ownership and 'buy in' for the project.

Needs Assessment

The project directors used three methods for conducting needs assessments: interviews, observations and review of printed materials. During the needs assessment process, they wanted to find out what the current and future basic skill needs were for manufacturing operators in HP CCMO.

The project directors also used this time to set the tone for the purpose of the project, which was not to be a remedial reading class but a workplace basic skills "training for excellence". The training was named Strategic Workplace Skills training. A conscious effort was made not to use the word 'literacy' because it was felt that the word had a negative connotation and limited the scope of the program to remediation.

The project directors were beginning to assess that the skills deficiency at HP was not so much a problem of missed opportunity in the formal K-12 educational system, as it was a problem of changing job requirements.

Interviews

The project directors began the needs assessment process with interviews. Interviews were conducted with all levels in the organizational structure to discover perceived basic skills needs. Specifically, for each job task analyzed, the operator and supervisor responsible for the job task were interviewed. During the interviews, the project directors asked the operator to describe his/her job task by task. Later in the project, the project directors became aware of the fact that in order to more precisely determine current and future skill needs within the production department, it was highly beneficial to also interview engineers working on the production processes, which they consequently did. These interviews proved to be extremely insightful in identifying the types of problems operators were facing and would face in the future.

During the interviews, much more information was acquired than needed for designing the basic skills training program. When the project directors realized they were getting this information, they tried to clearly communicate with the interviewees and the management in general about

what the training could and could not do, and what the project directors were and were not doing within the confines of the program. The training department liaison accompanied the project directors on these interviews. She used much of the information collected as a needs assessment for the training department. The employees interviewed were open and trusting. Part of this openness was due to the presence of the training department person who was highly respected and part of the openness was due to the culture of the organization itself. The project directors were able to get a good deal of information from the interviews. These interviews were conducted on a one-to-one basis for the most part.

Observations

The supervisors and section managers identified jobs throughout the CCMO organization which would be appropriate to observe to get the kind of information being sought.

The observations were primarily set up to perform the literacy task analyses. The project directors began by asking supervisors to identify SME (subject matter experts) in their departments. The training department liaison scheduled the interviews between these operators and the project directors.

During the observations, the operator showed the project directors how the job was performed. The project directors asked questions. The questions were aimed at identifying the cognitive processes the operator used when performing the job in order for the project directors to completely understand and analyze the basic skills being used.

Traditional literacy task analysis advocates the observation of only the workers interaction with the specific job task or piece of machinery assigned. The project directors began the literacy task analysis by using this method.

However, they discovered that they were not getting a complete picture of the overall skill set needed to perform identified jobs effectively. Consequently, they developed a model including observing workers interacting with machines, processes and co-workers in order to obtain a more complete picture of required skills. In addition to observing the worker at his/her assigned job, the project directors also observed team meetings, quality meetings, and general co-worker interactions, as well as getting other information on requirements not observable by merely watching a worker interact with their machine.

Reviewing Printed Materials

The project directors also looked at job descriptions and job manuals to ensure the precision of the task analyses. Any charts, procedural directions, memos , process change orders, etc. that the operator was expected to use on the job were collected and analyzed for skill level difficulty and also to use in the curriculum as functional context.

Subsequent to the job task analyses, the project directors analyzed the job tasks to determine what basic skills were needed to do the tasks effectively. The project directors developed Job Task Analysis Reports to summarize this information.

The information was presented to the CCMO manager, section managers and supervisors. The information was later used to prioritize basic skills training needs.

EVALUATION, FINDINGS AND TIMELINE: A needs assessment was designed and conducted generally throughout the plant and specifically within six job task areas in CCMO production. Three content areas were chosen to focus on for Strategic Skills Training.

The proposed timeline stated that all objectives within this goal would be completed by May, 1990. Due to organizational and personnel changes, this part of the project was significantly delayed. Also, the project directors realized, with the help of the HP training department, that this goal should also be expanded to include the focusing and 'buy in' process conducted at HP. The project directors believe that the entire project benefited from this expanded up front time.

Even though the changes initially delayed the timeline of the project, the project directors became aware that change is the norm in dynamic manufacturing organizations. Expecting changes and continuing to adapt to those changes is a necessary component of a successful workplace skills project.

GOAL II:

TO DESIGN A WORKPLACE LITERACY SKILLS TRAINING PROGRAM USING THREE IDENTIFIED HEWLETT PACKARD JOBS

ACTIVITIES AND RESULTS:

Instead of focusing on three jobs, management decided that they wanted to focus on skills that cut across jobs. The first area that the curriculum focused on was oral and written communication. The training program was named Strategic Workplace Skills: Oral and Written Communication and included components of Learning How to Learn. In addition, the needs assessment research was completed for Strategic Workplace Skills: Individual and Group Problem Solving.

Curriculum Design

Curriculum designers included project directors, two consultants hired with grant money and the training department liaison from Hewlett Packard. Curriculum designers met to determine the learning objectives. The learning objectives were determined based on the skills identified in the job task analyses and general objectives for the content area with specific applications to CCMO Hewlett Packard. (Please see accompanying curriculum outline.)

The curriculum was designed using the following format:

1) Focus on critical concepts
2) Introduce concept
3) Demonstrate thinking process
4) Model
5) Practice
6) Summarize

The project directors felt that it was important to select critical content and allow enough time for all of the participants to get a chance to think through the cognitive processes of communicating within that content area and to practice communicating during class time. They also felt that it was important for the trainer to model the type of communication being taught so that everyone was clear about the skill being taught.

The curriculum was designed using functional context materials. In other words, activities, worksheets and exercises within the class were relevant to the workplace and were developed from the specific types of job tasks, observations, and materials encountered during the job task observations and interviews.

Curriculum level

A cloze test was written and administered by the project directors to determine the appropriate literacy level at which the curriculum should be written. The cloze test was administered anonymously and to a modified random sampling of operators (25% of targeted population).(Please see cloze test included).

Curriculum evaluation

The project directors decided to conduct a multi-strand evaluation. The ultimate goal of the evaluation was to attempt to ensure transfer of training. Evaluation design consisted of:

1) **Supervisor likert-type evaluation of all employees prior to taking the training.** Supervisors were asked to rate operators on their communication skills before and after the training. The communication skills that operators were being ranked on were based on the content the training would be covering. After the first round of classes were underway, supervisors met with the project directors to develop criteria for ranking employees on the likert (ie. What specific characteristics does an employee ranking a 1 on meeting participation exhibit? a number 2? etc.) (Please see Supervisor's Assessment Criterion enclosed.)

2)**Pre and Post Operator likert-type self-evaluations were administered to all operators taking the training.** The operators were asked to rate themselves on communication skills based on the content of the training program. They were asked to rate themselves at the beginning and at the end of the training sessions.

3)**Pre and post content assessments were administered to all operators taking the training sessions.** Operators were asked to respond to specific situations which employed communication skills (eg., designing a training session for co-workers, writing an intershift memo, etc.)

Record keeping

A folder was kept for each participant. Records kept included pre and post content assessments, pre and post likert-type self assessments, pre and post supervisory likert-type assessment, pre and post participation surveys, Personal Development Plans generated by the participant and his or her supervisor, personal learning contracts and attendance records. Participants also filled out general evaluation reports on the training after each series. Participants regularly filled out "One Minute Action Sheets" giving feedback on the application of the training to their specific job.

Certification

The project directors and HP training staff worked with the director of the Colorado State University Division of Continuing Education non-credit courses to design a process to certify those participants who completed the training. Requirements for certification were as follows:

1) Attendance at 85% of the classes
2) Completion of pre and post assessments
3) Development of a Personal Development Plan signed by the supervisor
4) Completion of a Learning Contract
5) Attendance at a 30 or 90-day follow up session

EVALUATION, FINDINGS AND TIMELINE: The curriculum model worked well with employees at the operator level. The functional context was extremely beneficial. The CSU/HP certification was well accepted as a learning incentive.

Other than technical training, operator level workers have received little training designed specifically for them. The project directors believe that, in light of the expanded basic skill requirements, training should be designed specifically for that level of employee. Interpersonal, problem solving and goal setting training designed for mid and upper level management may not be appropriate for operator level employees.

Equally inappropriate is the use of traditional vocational education models of training.

The design of the multi-strand evaluation was philosophically sound, but impractical for the following reasons:

The likert-type self assessment done by each participant was helpful for the participants themselves. However, it was impractical to evaluate the success of the program based on movement up or down the rating scale. Many learners who ranked themselves high at a skill at the beginning of the training (eg. "I am a good listener."), ranked themselves lower on that skill by the end of the training because they had learned more about it and were more aware of their own deficiencies in that area. In that case, the success of the training would actually be signaled by a rating going down.

The supervisory likert-type assessment was invalidated in many cases by the fact that both supervisors and operators were in a state of transition during the course of the training. Therefore, it was impossible to get a consistent rating of the participant before and after the training because, often times, operators had different supervisors at the beginning and end of a seven week training session.

The content assessment was an open ended essay. The norming process needed to score this type of assessment were too cumbersome within the confines of the timeline of the project. Consequently, the content assessment became a comparative data tool for each learner. In other words, each participant was given a pre content assessment and a post content assessment and after completing them, they were returned to the learner and the learner compared the two assessments and was asked to give feedback on the differences.

The timeline of this goal was delayed relative to the delay in the start up process.

GOAL III - TO IMPLEMENT A BASIC WORKPLACE LITERACY SKILLS TRAINING PROGRAM FOR THREE TARGETED JOBS AT HEWLETT PACKARD

ACTIVITIES AND RESULTS:

Recruitment and Enrollment

The supervisory staff made the decision to make Strategic Workplace Skills: Oral and Written Communication training mandatory for all CCMO regular and on-contract production operators. As of August 1, 1991, 102 employees had completed the training. At that time, HP made the commitment to continue the training until all production operators had had an opportunity to participate, which extended beyond the time of the grant. By April, 1992, over 150 operators will have completed the training.

Schedule of Training

Eleven eight-week class sessions were scheduled and delivered at HP through April, 1992. The class schedule consisted of two sessions, two hours each per week for seven weeks and two two-hour follow up sessions scheduled at 30 days and 90 days. A total of at least 352 hours of training were delivered (approximately 5280 training contact hours). Classes accommodated scheduling for three shifts of work. The follow up sessions were designed to facilitate the transfer of training. Participants were asked to state if they had been using the skills on the job and how the skills were being used. The follow up sessions were also used to continue to encourage participants to use the skills.

Classes were held in training rooms on site at Hewlett Packard. A special small group course was designed for English as a Second Language employees. This class was not designed to meet the requirements for certification.

Delivery of Training

Five trainers were hired by Hewlett Packard and trained by the project staff to deliver the Strategic Workplace Skills training. Trainers included the two project directors, the Hewlett Packard training department liaison to the project and two outside local trainers. Training for Trainers consisted of a four-hour overview of philosophy and techniques. All of the trainers used in the project also helped to write the curriculum. Therefore, they were well-versed in the content of the course before the beginning of the training . In addition, the project directors met with all the trainers on a biweekly basis during the first round of classes to get feedback on the curriculum. Also, to make any necessary changes in the curriculum not yet presented.

Supervisor Training

In addition, two supervisors' trainings were conducted before the beginning of the first class series to acquaint the supervisors with the scope and sequence of the curriculum and to deliver specific training on the personal development plan which they were going to work with employees on during the course of the training. Further supervisor training was scheduled for two months after the initiation of the employee training, but was canceled due to time constraints of the supervisors.

Near the end of the project, a Supervisors' SWS Oral and Written Communication Coaching Class was designed and delivered to inform supervisors of the content of the training their employees were receiving and to facilitate transfer of training on the shop floor. Goals of the training were:

1) to inform supervisors of the content covered in the Oral and Written Communication training

2) to reinforce supervisors' skills

3) to offer coaching tips to help supervisors facilitate transfer of training for operators.

Nine supervisors took the training and gave feedback on the process. (Please see supervisors feedback included in this report.)

Individual Education Plans

Participants completed personal Learning Contracts for skills they wished to improve during the course of the training. In addition, they had the opportunity to meet with their supervisors to discuss training directions and improvement goals using a personal development plan format.

Evaluating Participants

All participants completed pre and post assessments as outlined in this report on Goal II.

EVALUATION, FINDINGS AND TIMELINE: The project directors feel that the way the training became mandatory (i.e., a decision made late in the process after many operators were under the impression that enrollment would be voluntary and without an adequate communication plan as to why it was being changed from voluntary to mandatory) was a detriment to the overall success of the program. A significant proportion of the participants stated resentment at the mandatory nature and the process of enrollment. Course trainers felt that this resentment impeded the learning process for the whole group.

The length of the training did not conform to the regular pattern of training at HP, it was longer than most. Other training schedule configurations could be considered in the future.

Enrollment figures and number of hours spent in training exceeded goals as stated in the grant proposal. The goal for the number of participants to be served was 80. The actual number served was over 100 by the end of the grant period and over 150 by April, 1992. The goal for number of courses offered was four eight-week courses or 128 hours of delivery. Actual number of courses offered was eleven eight-week courses (352 hours of delivery).

This goal was completed within the projected timeline of the grant.

GOAL IV - EVALUATE THE EFFECTIVENESS AND EFFICIENCY OF THE PROGRAM

ACTIVITIES AND RESULTS:

Maintain records for evaluation

All processes used to research, design and implement the program were documented.(See contents of this report.) The pre and post likert-type supervisory and self assessments as well as the pre and post participant surveys were evaluated.

The curriculum was evaluated and revised on an ongoing basis. The curriculum was significantly streamlined and revised after the first round of classes. Feedback on the curriculum and program was collected after each training series at the 30 and 90 day follow up sessions. Anecdotal information was collected on an ongoing basis after each training session on a One Minute Action Sheet designed by the curriculum developers. The One Minute Action Sheet provided information on how skills taught in the classes were being applied in the workplace. (See participant feedback included with this report.)

The project directors prepared and presented a formal final evaluative report to the managerial staff of CCMO in December of 1991. The final report was given in the form of a White Paper (included with this report) and a two-hour presentation and discussion. At this final evaluative meeting, HP management decided to continue the delivery of the Strategic Workplace Skills training beyond the grant period.

Replication

The entire curriculum was packaged for replicability within Hewlett-Packard. Much of the content was proprietary and not available for replication. The overall outline of the content, course goals and objectives are included with this report.

Dissemination/Information Sharing

Information about the grant activities and findings was disseminated by the project directors through the following avenues:

U.S. Department of Education Conference
Atlanta, Georgia

Colorado Department of Education
Area Resource Teacher Training

American Association for Adult and Continuing Education
Annual Conference, 1990
Salt Lake City, Utah
Presentation

American Association for Adult and Continuing Education
Annual Conference, 1991
Montreal, Canada
Presentation

Colorado Association for Adult and Continuing Education
Annual Conference, 1990
Fort Collins, CO
Presentation

Colorado Association for Adult and Continuing Education
Annual Conference, 1991
Denver, CO
Presentation

Colorado Council for the International Reading Association
Annual Conferences, 1991 and 1992
Denver, CO
Presentations

Colorado Community College Office of Educational Services
National Workplace Literacy Project
Colorado Front Range Region
Training, 1991
Advisory Board, 1991-92

U.S. Department of Labor
Regional Conferences, 1991 and 1992
Denver, CO
Training and Presentation

U.S. Department of Education
Project Directors Policy Conference, 1991
Washington, D.C.

Colorado Department of Education
Workplace Literacy Train the Trainer
Denver, CO
Module Development, 1990

Colorado Department of Education
Area Resource Teacher Regional Training
Loveland, CO 1991
Training

"Critical Issues in the Setting the Stage for a Workplace Basic Skills Program"
Article published in James Madison University Review, 1990

Information disseminated by project directors upon telephone request to:

University of California, Berkeley
University of Texas
Utah Workplace Literacy Project Director
Goodwill Industries, Texas
Right to Read Program at Monfort Industries, Greeley, CO
University of Arkansas
Arapahoe Community College

EVALUATION, FINDINGS AND TIMELINE: The project directors found comprehensive evidence at HP Fort Collins Site that basic skills used in that workplace are consistent with those described by Carnevale in 1988

(as published in "Workplace Basics: The Skills Employers Want"). Processes, organizational structures and technology are in a constant state of change requiring a continuous upgrade of skills.

The project directors believe that skills upgrading is a multi-faceted endeavor. Employees must exhibit a desire to upgrade and use skills and organizations must support and facilitate the acquisition and use of upgraded skills. Project directors believe that best practices for training and delivery of workplace basic skills are still evolving. The field of workplace literacy and basic skills training for manufacturing operators is in its embryonic stages. There is still a great deal to be learned.

The project directors believe that the bottom line for the effectiveness of training is in enhanced job performance which is beneficial to the organization. The fact remains, however, that assessment of the impact of training on productivity and performance is difficult to measure because there are so many other events that influence those factors. For example, while this project was being conducted at in CCMO at HP, a completely new technology was being introduced to the production workers. This new technology created, among other things, a significant organizational change, which included changes in supervisors and the addition of a third shift. Also, a major part of the operation was being relocated, creating uncertainty for some workers. It would be difficult to determine the impact of the training in the midst of these large scale changes. The project directors did design the curriculum with transfer of training as the ultimate goal and believe that transfer of training does occur. Conducting thorough needs assessments can ensure that the skills targeted for training are appropriate to the specific workplace. In other words, the training is valid. The project directors are confident that this is the case for the training designed as a result of this grant.

Additional comments

The fact that Hewlett Packard decided to continue with Strategic Workplace Skills training and hire the project directors contractually to finish the Oral and Written Communication training and design and deliver the Group and Individual Problem Solving training is the strongest indication that the grant project design, management and implementation was well received within the organization and found to be beneficial to the continually evolving HP CCMO production workforce. It is also a positive reflection on the Hewlett Packard management concern and support for operator level employees.

During the entire grant project, the training department personnel, Hewlett Packard management personnel and the project directors maintained a very positive and mutually collaborative relationship. The project as a whole benefited greatly as a result of this support. The relationship between the U.S. Department of Education grant officers and the project directors was also very facilitative.

The partnership between the U.S. Department of Education and the private sector is beneficial to both partners.

The education partner has the opportunity to expand knowledge in a way that is not completely at the business' expense. The business partner has the opportunity to use the expertise of the education partner not completely at its own expense.

The area of workplace basic skills is in its formative stage. Therefore, the education partner needs to remain flexible and responsive to the resulting dynamics in order to meet the business' needs. Best practices are still being developed.

Workplace Applications of Basic Skills

A National Workplace Skills Project

White Paper

December 1, 1991

Prepared by:

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U.S. Department of Education National Workplace Skills Project Co-Directors

Workplace Application of Basic Skills: A National Workplace Skills Project

A White Paper

Introduction

The National Workplace Project sponsored by the U.S. Department of Education provides assistance for demonstration projects that develop and implement models for workplace skills training through exemplary partnerships between business/industry and educational organizations. The "Workplace Application of Basic Skills" project was designed to upgrade workplace basic skills for the purpose of promoting productivity, retrainability, job retention and/or job advancement. The project created a partnership among Hewlett Packard Fort Collins Site, Lutheran Family Services and Colorado State University Division of Continuing Education. The project began May, 1990 and ended October, 1991.

Colorado Computer Manufacturing Organization was identified to participate in the project. Jobs within CCMO were analyzed to determine what basic skills are needed to perform the jobs effectively. Skills were identified and training was developed based on prioritized basic skills.

In summary, there were three purposes for this project: 1)as a demonstration to be modeled and duplicated in other business and industry settings, 2) as a training to be designed and delivered at Hewlett Packard Fort Collins Site and 3) to explore the feasibility of business/education partnerships as a means for providing quality workplace basic skills program design and delivery.

This white paper contains a description of the activities during the project, the results and findings and the recommendations.

Needs Assessment Process

The needs assessment process began with the background information detailing the reasons for basic skills enhancement programs. The following were identified as critical factors affecting the workplace:

- Rapid technological change in the workplace
- Pressures of a global economy
- Introduction of new quality improvement tools
- Increased reliance on small, autonomous teams
- Greater demands on information processing and decision making capabilities
- Human needs in increased stress and rapidly changing work situations

In order to assess basic skills needs for jobs at HP CCMO, representative jobs were identified by the Production Manager, Section Managers and Supervisors. Skills needed for those representative jobs were assessed through interviews, observations and reviewing printed materials needed for that job. Interactions between workers and other workers, workers and processes and workers and things (machinery) were also analyzed.

As a result of the identified critical factors affecting the workplace and the job basic skills task analysis the following were identified through the literature (a survey conducted by the American Society For Training and Development, 1988) and corroborated during the needs assessment process at HP CCMO:

- Learning to Learn
- 3 R's: *Reading, Writing and Computation* (Workplace applications of these skills)
- Communication: Listening and Oral Communication
- Creative Thinking
- Problem Solving
- Self-Esteem
- Goal Setting
- Interpersonal, Negotiation and Teamwork
- Organizational Effectiveness (Understanding the Organization's goals, role and vision)

From this list of basic skills, CCMO management chose and prioritized the basic skills as follows:

1. Oral and written communication
2. Individual and Group Problem Solving
3. Learning How To Learn

Design and Delivery of Training

A functional context curriculum in Oral and Written Communication was developed for CCMO production line workers based on the results of the needs analysis. Learning objectives for the course were derived directly from the business needs stated by CCMO management and staff and are therefore valid for the CCMO manufacturing work environment. Exercises and examples used in training concern everyday problems and challenges encountered on the CCMO manufacturing floor and facilitate the transfer of skills learned to the job.

The goal of instruction was to improve and build upon the underlying structure of basic skills which operators possess in order to help them meet the challenges of a constantly changing work environment requiring continuous upgrading of skills. Training design and methodologies were targeted directly at the operator level and included additional time for modeling of skills taught, recognizing thinking processes needed to use skills, practice time, and participant feedback on application of skills to the job. Courses were highly interactive and 28 hours long with two 2-hour follow up sessions scheduled at 30 and 90 days after completion of course.

Participants received a certificate of completion from Colorado State University Division of Continuing Education and Hewlett Packard after meeting the following requirements:
- 85% attendance at classes
- attendance at one follow up session
- completion of a personal learning contract
- generation of a written development plan with their supervisor
- completion of pre and post assessments

In order to further encourage application of skills learned to the job, an accelerated version of the course was developed for supervisors. The purpose was to help supervisors facilitate the transfer of training for operators of skills learned in the Communication course. Goals of the training were:
- to inform supervisors of the content covered in the Oral and Written Communication training
- to reinforce supervisors' skills
- to offer coaching tips to help supervisor's facilitate transfer of training for operators

Deliverables from the design and delivery phase of the project include:
- 32 hours of Strategic Workplace Skills: Oral and Written Communication instruction weredesigned specifically for CCMO production line operators

- 150 participants completed training and received certificates (additional trainings are planned through Spring of '92)
- 4,800 contact hours of training were delivered
- 5 trainers were trained to deliver instruction (two trainers were hired from the outside)
- 12 hours of instruction were designed for supervisors to facilitate transfer of training
- 10 supervisors completed accelerated version of training (approximately 15 supervisors attended 3-hour trainings in March and May)

Results and Findings

Government (U. S. Department of Education)/Educational/Business Partnerships

- Government partner has to be able to be more responsive to business timelines. The application and granting process are too lengthy.
- Government partner has to be able to be flexible concerning the timelines stated within the grant proposal and remain sensitive to business needs. For this grant, the start up date for service delivery was August, 1990. But because of major organizational and personnel changes, it became impossible to stay with this timeline. The government partner was flexible in this circumstance.
- Business can benefit from and leverage government grants if they are willing to be flexible. Hewlett Packard CCMO was able to demonstrate this. The grant was awarded just as some major organizational changes were occurring (buying out Apollo and introducing Surface Mount Technology). CCMO decided that the in spite of timing being off for the initiation of the grant effort, that it would still be beneficial to proceed with the grant and make use of the grant resources.
- The partnership is beneficial in a field such as workplace basic skills which is relatively new. The educational partner has the opportunity to expand knowledge which is not completely at the business's expense. The business partner has the opportunity to use the expertise of the educational partner not completely at its own expense.
- The business partner can help add to the field of knowledge. In the case of this grant, the results have been and will continue to be widely disseminated. This allows other American businesses and adult educators to benefit from the results.
- The original idea in establishing the partnership with Colorado State University Division of Continuing Education was to be able to offer Continuing Education Units (CEU's) to training participants. However, participants were not interested in receiving CEU's. CSU Division of Continuing Education did provide the Strategic Workplace Skills Certificate to participants completing the training sessions.

Needs Assessment

- Include as many levels of the organization as possible in the needs assessment process. The information is more complete, people become acquainted with the program and it offers the opportunity for "buy-in" at all levels.
- A basic skills job task analysis should include analyses of interactions between workers and machines, workers and other workers and workers and processes to identify all basic skills needed on the job.
- Include assessment of future needs by interviewing management and design engineers.
- Take the opportunity during this time to clarify expectations. Ensure people understand what the program is/is not.
- Basic workplace skills are going to be continuously increasing for the foreseeable future. For example, the basic skills needed for Surface Mount Technology are higher than those needed for Through Hole.

Training Design

- The basic skills program was named Strategic Workplace Skills. Using the word literacy or even basic skills were considered demeaning to potential participants and was not deemed broad enough to encompass the expanded sense of basic skills due to the critical factors affecting the workplace.
- Basic skills training that is associated with a cultural shift requires a holistic approach to be effective. In the case of this project, the enhanced basic skills requirements are the result of new demands placed on workers. Upgrading skills necessary to assume those responsibilities addresses part of the need. In addition, the corporate culture must also be ready to support the new skills in light of the increased responsibilities. In the case of this project, the corporate culture is still unclear or, at least appears to be unclear to operators and supervisors, about what role expectations are and how the new skills are to be exercised within the work setting.
- Other than technical training, little training has been designed specifically for operator level workers. Instructional design should include opportunities for modeling, practicing and exploring information in incremental steps in order to fully develop cognitive processes.
- Communications skills deficiencies may be due to skills deficiencies, affect deficiencies(for example, some operators may have very strong skill sets but may not be good communicators) or both. This training focused on communication skills deficiencies as they relate to poor skills sets.

Training Delivery

- Decide if the training is mandatory or voluntary. Adults learn best if the activity is voluntary. However, if the training is mandatory, communicate reasons and expectations.
- A 28 hour training spread over eight weeks is not the norm for workplace training and therefore that model may face some resistance.
- The absence of training norms may cause problems. Operators perceived the lack of snacks during training as a slight by management.
- If there is work outside the training class, support to complete that work must be clearly understood and agreed upon by those who will be in the supporting position. For this project, participants had to work with supervisors on goal setting. Not all supervisors were clear about their role and supervisors changed in the middle of some of the classes making the outside work difficult to complete.
- Being able to integrate information form one training to an overall plan is difficult. The operators tend to treat each individual training effort as isolated.
- Most commercially published material dealing with basic skills issues is limited to traditional academic approaches. Over the past eighteen months, however, more is being developed and published, so, this picture may change.

Evaluation/Impact

- Assessment of impact of training on productivity and performance objectives are difficult to measure. Conducting thorough needs assessments can ensure that the skills targeted for training are appropriate to the specific workplace, in other words, the training is valid. But, it is difficult to measure factors such as productivity, decrease in absenteeism, scrap rate and their direct relationship to a training because there are so many other events that influence those factors.

- Collecting anecdotal information for the purpose of evaluating the training program was valuable. Anecdotal information demonstrated how the communication skills were being used on the shop floor, the positive changes supervisors saw. Operators complained about the lack of supervisory communication skills and that they did not feel supported using their new skills. Complete anecdotal information is being processed.

- Quantifiable data collection methods were also used. Pre and post assessments to determine skill levels were given to participants. Operators demonstrated a heightened awareness of communications skills as evidenced in the self-assessment. They also, overall, demonstrated improvement in their knowledge of the content skills as demonstrated in the content pre and post assessments.
- Supervisors were also asked to pre and post rate participants on a likert-type scale. The data collected here proved insufficient because supervisors and operators were in a constant state of rearrangement during the grant time period.
- Participants thought that the training was long but they saw some positive benefits such as getting to know other operators better.
- Training was designed for the operator level. Techs also participated. The operators liked having the techs in the training sessions but the techs were not challenged enough.
- Even when participants conceptually understood the content of the class, some did not feel comfortable or were unable to use the skills. During each class, there was time for participatory exercises, some could not or chose not to participate in these.
- There is a great skills attainment spectrum among the operators. Some operators obviously are very skilled and others have significant basic skills deficiencies.

Corporate Environment

- Change is the norm. Change in personnel, shifts, organizational structure and priorities occurred constantly during the project. Expecting changes and continuing to pursue how the project can met HP's business needs was important.
- Many operators perceived inconsistent expectations and therefore there was resistance to the training because they considered it "the program of the week".
- Operators did not have a clear idea about why they needed many of the skills included in the training. In some cases, they did not understand the expectations placed on them in the changing work environment.

Dissemination

Part of the responsibility of this project was to disseminate the information gained to the field of adult education and specifically adult education in the area of workplace basic skills. To date, the following activities have taken place to this end:

- American Association of Adult and Continuing Education Anual Convention
  Montreal, Quebec, Canada, 1991. Presentation.
  Salt Lake City, Utah, 1990. Presentation.
- Colorado Association of Continuing and Adult Education
  Denver, 1991. Presentation
  Fort Collins, 1990. Presentation
- Colorado Department of Education
  Training of Area Resource Teachers , 1990-91
  Development of Workplace Literacy training materials, 1990
- Colorado Council For the International Reading Association
  Denver, 1990
- U.S. Department of Labor
  Training, 1990
- Colorado Community College & Occupational and Education System Workplace Literacy Program
  Training, 1991
  Curriculum Advisory Council, 1991-92

- U. S. Department of Education
  Project Directors meeting, 1991(proceedings from this meeting will be used to develop policy)
  roject Directors meeting, 1990

Recommendations

Management Support Issues

The 'new' basic skills being taught operators in the Strategic Workplace Skills training require an environment where employees understand their job description and expectations concerning communication, decision making, leadership, ownership, empowerment to act and responsibilities concerning the problems and processes on the CCMO production line floor. For the new skills to thrive, they require an environment where coaching and facilitation by supervisors becomes an integral part of the supervisor's role.

In order to create that type of environment and support and therefore raise the overall competitiveness of CCMO production workers, the following recommendations are submitted:

- Clarify HP CCMO vision, business direction and job expectations for supervisors and operators among management level staff
- Communicate vision, direction and job expectations to all CCMO employees
- Support transfer of training for operators
  - 'Walk the Talk' on vision, direction and job expectations
  - assess the type of support needed through employee feedback
  - enhance management/supervisor coaching and facilitation skills through training
- Make coaching and facilitating operators a priority for supervisors
- Standardize policies and norms for basic skills training courses
- Assess the basic skill level of all CCMO production line workers and compare with baseline standards of skills needed for future CCMO production line jobs, in order to increase understanding of depth and direction of future training
- Continue to recognize the importance of 'new' basic skills training for operator-level employees

Basic Workplace Skills

- Some operators need basic reading, writing and math skills upgrading
- If basic workplace skills training is mandatory, consideration should be given to screening so that those who do not need it will not have to take the training.
- Math for SPC and calculator use
- Individual and group problem solving
- Self-esteem building
- English as A Second Language
- Cultural diversity awareness training
- Coaching and facilitating for supervisors and operators
- Learning How To Learn (integrating)
- Team skills and understanding the roles of individuals on teams
- Consider workplace basic skills training as a process of evolving as basic skills needs develop and evolve
- Training be delivered in configurations congruent with other types of training at HP, for example, in four hour individual modules instead of 28 hours over seven weeks.

Workplace Applications of Basic Skills

A National Workplace Skills Project

Initial Brief

Sally K. Robinson
Chris Kneeland
Project Co-Directors

WORKPLACE SKILLS ENHANCEMENT

BRIEF

BACKGROUND:

Title: Workplace Applications of Basic Skills
Source: U.S. Department of Education National Workplace Grant in collaboration with Lutheran Family Services of Colorado and Hewlett Packard, Fort Collins Site
Duration: 15 months
Number of Grants Funded: 39 out of 208; only one funded in Rocky Mountain region

PURPOSE:

The National Workplace Program sponsored by the U.S. Department of Education provides assistance for demonstration projects that develop and implement models for workplace skills training through exemplary partnerships between business/industry and educational organizations.

DEFINITION OF BASIC WORKPLACE SKILLS:

Functional reading, writing, math, communication and critical thinking skills that workers and trainees use to perform specific job tasks.

CRITICAL FACTORS AFFECTING THE WORKPLACE:

* Rapid technological change in the workplace
  - retraining due to robotics and phasing out of production line jobs
  - more sophisticated equipment and shop-floor control systems
  - frequent changes in production processes
* Pressures of a global economy
  - need to reduce operating costs and improve quality
  - increased production speed/ reduced breakeven time
* Introduction of new quality improvement tools
* Increased reliance on small, autonomous teams
  - greater responsibility and accountability of workers at all levels
  - need to rotate among jobs
  - need to communicate clearly within and outside of teams both orally and in writing
  - need for flexibility
* Greater demands on information processing and decision making capabilities
  - increased supply of information to workers: verbal, written, numeric, alphabetic, hard-copy or electronically displayed
* Human need
  - increased stress
  - need to experience sense of self esteem and job satisfaction at new expected level of performance

ALL OF THESE FACTORS RESULT IN A NEED FOR A HIGHER LEVEL OF READING, WRITING, COMMUNICATION, COMPUTATION AND CRITICAL THINKING SKILLS.

STRATEGIES:

* Work with training department, managers, supervisors and line workers to decide on focus of the project and determine priority needs
* Write basic to intermediate workplace skills curriculum based on specific focus, needs and/or targeted job skills
* Deliver training to participants in flexible, worker-centered environments
* Evaluate effectiveness of training and overall impact of program

OUTCOMES:

* A skills enhancement training program will be designed and implemented for jobs or programs targeted by HP training department, organization managers and supervisors, and project workplace skills consultants
* Training participants will upgrade their basic workplace skills which will, in turn, affect job performance, quality and productivity
* Training participants will experience satisfaction in being empowered to achieve higher levels of job performance
* Hewlett Packard will be a recognized leader in helping to develop effective, high quality workplace skills training programs

WORKPLACE BASICS

FIGURE 3

WORKPLACE BASICS: A CHECKLIST

- ☐ Learning to Learn
- ☐ 3 R's (Reading, Writing, Computation)
- ☐ Communication: Listening & Oral Communication
- ☐ Creative Thinking/Problem Solving
- ☐ Self-Esteem/Goal Setting-Motivation/ Personal & Career Development
- ☐ Interpersonal/Negotiation/Teamwork
- ☐ Organizational Effectiveness/Leadership

From: Workplace Basics: The Skills Employers Want, American Society for Training and Development, US Department of Labor, Employment and Training Administration

Workplace Applications of Basic Skills

Lutheran Family Services/Hewlett-Packard

Media Release

Hewlett-Packard Company
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HEWLETT
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LUTHERAN FAMILY SERVICES/HEWLETT-PACKARD MEDIA RELEASE

CONTACT: John Monahan
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June 10, 1991

FOR IMMEDIATE RELEASE

Since last June, a cooperative community venture between adult educators, adult learners, and business leaders has been taking shape at Hewlett-Packard in Fort Collins.

This unique partnership began when Lutheran Family Services received a $96,000 grant from the U.S. Department of Education's Office of Vocational and Adult Education. The grant, the only one of its kind funded in the Rocky Mountain Region, is being used to develop and implement a strategic, employee-tailored workplace skills enhancement program in the HP-Fort Collins Colorado Computer Manufacturing Organization (CCMO). Hewlett-Packard is contributing funds and other resources to the project as part of a nationwide effort to upgrade workforce skills.

Program goals include: making education relevant to the workplace by helping employee participants rediscover their innate abilities and develop new skills to better prepare for the increasing demands of a constantly changing workplace; reinforcing the concept that learning is a lifelong process, not one that ends with high school or college; and sharing information with other companies to encourage the development of similar skills enhancement programs.

National Workplace Project codirectors Sally Robinson (Fort Collins Public Library READUP Program Director) and Chris Kneeland (Lutheran Family Services LIFE Adult Learning Services Program Director) selected HP-Fort Collins for this new skills enhancement program, because of the company's position as an industry leader and the HP site managers' commitment to developing employees along a path of lifelong learning.

Robinson, Kneeland, and CCMO training specialist Susan Dryovage began by working side-by-side with managers and employee participants -- HP production operators, technicians, and supervisors -- to identify the critical skills needed for their jobs today and in the future.

-more-

The team identified and agreed to focus on two critical needs: oral and written communication and problem solving. In March, 45 employee participants began attending the first of 14 two-hour classes in communication. Course topics include assertive communication, group dynamics, conflict management, presenting information (to individuals and groups), giving feedback, and goal setting. Skills in "learning how to learn" have been incorporated into both classes.

Twenty seven additional employees have already begun the next wave of communication classes, and this fall, employee participants will begin a new class segment that focuses on individual and group problem-solving skills. By next June, more than 150 HP production employees will have attended both class segments.

When these classes are completed, HP will have two custom programs specifically designed to enhance the skills of its production staff members. HP managers would like to use the training programs at other corporate sites, and program developers hope that the new curriculum will serve as the foundation for a skills enhancement model that other U.S. corporations can use to empower workers for tomorrow's challenges in the international marketplace.

By mid October, the program developers' report on curriculum design will be available through the U.S. Department of Education's Office of Vocational and Adult Education.

The program's first 45 "graduates" recently received certificates issued by Colorado State University's Division of Continuing Education and Hewlett-Packard. The certificate acknowledges completion of the communication course requirements and follow-up activities.

-END-

Workplace Applications of Basic Skills

A National Workplace Skills Project

with

Hewlett-Packard, Fort Collins Site

Production Training Plan

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HEWLETT PACKARD

Workplace Applications of Basic Skills

A National Workplace Skills Project

Job Task Analyses

Job Task Analysis

Position: Production Operator
Job Task: MAST Handload

JOB TASKS	WORKPLACE BASIC SKILLS
1. Prioritize work order considering: a. 1st in – 1st out. b. "Hot" and "warm" boards. c. Royonics.	1.1 Understanding sequential relationships. 1.2 Recognizing cause & effect relationships. 1.3 Visual discrimination of numbers. 1.4 Prioritize actions.
2. Start work order. a. Start system. b. Select work order on screen. c. Wand in bar code from queue card. d. Input quality control number. e. Fill in hand load log sheet.	2.1 Understanding procedural directions. 2.2 Visual discrimination of numbers. 2.3 Operating basic computer functions. 2.4 Entering appropriate information onto a form.
3. Collect appropriate materials according to documentation. a. Locate WEZ TOTE according to queue card. b. Identify trays of kit sets according to alpha and WO numbers. c. Calculate number of remote stock parts if needed according to documentation, number of parts, number of boards, and size of tubes. d. Locate helper bars and knobbies if needed.	3.1 Combine information from multiple sources. 3.2 Visual discrimination. 3.3 Following numerical/alphabetical sequences. 3.4 Skimming/scanning numbers. 3.5 Adding, subtracting, multiplying and dividing single and multiple digit numbers. 3.6 Using computation skills to solve problems.
4. Check documentation considering: a. MB changes. b. Pre-load instructions. c. Framing instructions. d. Correct part numbers in kit set.	4.1 Cross-referencing within source material to select information to perform a routine. 4.2 Identifying components within a schematic. 4.3 Applying information from schematics to select action. 4.4 Visual discrimination of numbers. 4.5 Identifying and using details, labels, parts from a key or legend.
5. If part number or description in documentation not imprinted on part in kit, check photo or material list. Contact material handler, stores or IQA to verify as needed.	5.1 Cross-referencing material to verify course of action. 5.2 Applying information from a schematic to complete a task. 5.3 Locating information on a 2-column chart. 5.4 Categorizing charted material to locate information.

JOB TASKS	SKILLS
6. Mount frame and adjust schematic if needed according to documentation considering relative position to dyna pace feed chain.	6.1 Applying preventative measures to minimize problems. 6.2 Understanding orientational relationships. 6.3 Applying information from a schematic. 6.4 Following procedural directions.
7. Pre-load parts and handload board according to documentation, color coding, reference designators, and polarity markings.	7.1 Applying information from a schematic to complete a task. 7.2 Identifying and using details, labels, and parts from a key or legend. 7.3 Identifying similarities and differences in objects. 7.4 Visual discrimination for matching numbers. 7.5 Following sequenced illustration as a guide.
8. If part doesn't fit, check for pre-form instructions. Communicate problem with pre-form operators.	8.1 Determining the cause of a problem. 8.2 Visual discrimination for matching numbers. 8.3 Understanding orientational relationships. 8.4 Identifying and interpreting codes and symbols. 8.5 Summarizing essential details. 8.6 Understanding and using appropriate tone.
9. Complete work order process. a. Load each frame on track when complete with splash guard toward solder wave until correct number completed. b. Return WEZ TOTES, trays and documentation to appropriate places. c. Complete WO on system. • input quality control number and bar code from queue card. d. Fill out queue card. e. Fill out handload log sheet. f. Take queue card to wave operator to cash out. g. Fill out DDT sheets if necessary.	9.1 Following procedural directions to complete a task. 9.2 Understanding cause & effect relationships. 9.3 Filing information using alpha and numerical sequencing. 9.4 Operating basic computer functions. 9.5 Identifying and using details, lables, and symbols from a key or legend. 9.6 Entering appropriate information onto a form. 9.7 Writing brief descriptions of problems and actions taken.
10. Work as a team with other operators. a. Communicate or leave notes for next shift if necessary. b. Offer assistance and feedback as necessary. c. Work together with up- and down-stream	10.1 Predict and process problems. 10.2 Analyze cause & effect. 10.3 Synthesize information to determine best course of action. 10.4 Identify critical attributes for communication. 10.5 Apply group decision-making procedures. 10.6 Prioritize actions. 10.7 Writing and explaining brief descriptive accounts. 10.8 Summarize essential details. 10.9 Use appropriate tone.

Job Task Analysis

Position: Production Process Operator
Job Task: MAST Test and Repair (Fix-it)

JOB TASKS	WORKPLACE BASIC SKILLS
1. Prioritize queue card considering: a. 1st in – 1st out. b. "Hot" and "warm" boards.	1.1 Prioritizing actions. 1.2 Locating information. 1.3 Interpreting symbols.
2. Gather correct materials, equipment. a. Match queue card to WEZ TOTE tag. b. Match board number with test system and fixture according to documentation.	2.1 Matching numbers. 2.2 Recognizing cause and effect (selecting appropriate course of action).
3. Begin test. a. Engage fixture onto machine. b. Visually inspect fixture for obvious damage (dust, bent leads). c. Turn on system and load program. d. Engage board onto fixture. e. Start test according to documentation for test system. f. Answer on-screen questions.	3.1 Literal comprehension (following sequential directions). 3.2 Visual discrimination. 3.3 Operating basic computer functions.
4. If board fails, read print-out for description of failure.	4.1 Literal comprehension (identifying factual details).
5. Check failure according to past experience with same failure or job aides. If suspected, check fixture, board and system for "hokey" failures.	5.1 Comparing and contrasting (combining information from multiple sources). 5.2 Identifying similarities and differences. 5.3 Distinguishing between relevant and irrelevant information. 5.4 Applying information from charts to locate malfunctions.
6. Locate area of failure on board using print-out and/or documentation.	6.1 Reading 2-column charts. 6.2 Locating and using references. 6.3 Identifying components within a schematic.
7. Visually inspect board at failing location for: a. Opens (etches broken or damaged). b. Shorts (etches touch or cross incorrectly). c. Solder bridges d. Backward parts - polarity wrong. e. Leads not through board. f. Leads soldered to board incorrectly. g. Wrong parts or part labeling. h. Wrong part positions. i. Add-ons missing.	7.1 Visual discrimination. 7.2 Matching numbers. 7.3 Interpreting a schematic. 7.4 Determining the presence of a defect.

JOB TASKS	SKILLS
8. Verify failures using instruments (digital multimeter, ohm/volt).	8.1 Reading a meter. 8.2 Using and understanding a measuring device.
9. If failure not found, use documentation to locate connecting parts/nodes and trace out.	9.1 Identifying components within a schematic. 9.2 Cross-referencing charted material. 9.3 Locating chart information at intersection of rows and columns. 9.4 Isolating problem components in schematic, tracing to cause of problem, interpreting symbols. 9.5 Using flow charts and computer menus to access information.
10. Visually inspect associated parts as in step 7.	10.1 Visual discrimination. 10.2 Matching numbers. 10.3 Interpreting a schematic.
11. Repair/replace part (all steps not always necessary). a. Unsolder. b. Replace/repair, depending on part, type of failure and step in test. c. Resolder.	11.1 Determining the presence/extent of a defect (compare/contrast). 11.2 Distinguishing between relevant and irrelevant information. 11.3 Identifying components within a schematic. 11.4 Following sequential procedures.
12. Retest and repair board as in steps 1 & 11. if board continues to fail on same part, route to BANDIT.	12.1 See skills 1-11
13. Fill out DDT form.	13.1 Writing key technical words accurately. 13.2 Entering appropriate information. 13.3 Writing brief, descriptive accounts. 13.4 Outlining a situation by key ideas.
14. If board passes, give quality mark, initial board, bag if needed and route to next station according to documentation.	14.1 Locating references 14.2 Reading charts to obtain information. 14.3 Following procedural directions.
15. Work as a team with other operators. a. Leave notes or orally communicate to next shift if a testing process is left unfinished or if experiencing particular "hokey" failures. b. Participate in developing job aides. c. Work on targeted failures in teams to troubleshoot/redesign.	15.1 Writing key technical/appropriate words. 15.2 Outlining a situation by identifying key ideas. 15.3 Summarizing events and stating general impressions. 15.4 Interpreting/using appropriate tone/mood for communication. 15.5 Listening for the main idea. 15.6 Discriminating between facts & opinions. 15.7 Drawing conclusions from facts. 15.8 Predicting future events based on trends, prior experience. 15.9 Comparing/contrasting recognizing trends.

JOB TASKS

SKILLS

15.10 Applying knowledge from previous experience to a new situation.

15.11 Distinguishing between relevant and irrelevant information.

15.12 Understanding basic computer operations and inputting data.

15.13 Prioritizing actions.

15.14 Analyzing cause & effect.

15.15 Synthesizing information to determine a course of action.

Job Task Analysis

Job Classification

Position: ~~Machine~~ Operator/Auto Insert
~~Job Task~~: MAST Auto Insertion, Flex Mods 1 - 6

JOB TASKS	WORKPLACE BASIC SKILLS
1. Bring up system if down. a. Log on, enter password. b. Press "next".	1.1 Interpreting/keyboarding basic commands.
2. Prioritize work order selection considering: a. 1st in – 1st out with set up ready. b. "Hot" boards. c. Running work orders of same board #'s.	2.1 Understanding sequential relationships 2.2 Recognizing cause and effect relationships. 2.3 Visual discrimination of numbers. 2.4 Prioritizing actions.
3. Locate and read queue card, WEZ TOTE tag, set-up sheet, manual documentation, and manufacturing bulletin (MB). a. Verify if current and correct. b. If MB applies to AI, make sure appropriate changes have been made. If not, make changes and alert appropriate parties.	3.1 Identifying & locating references. 3.2 Combining information from multiple sources. 3.3 Reading and understanding technical vocabulary and procedural directions. 3.4 Skimming/scanning.
4. Load Machine a. Turn on machine (power switch & palm switch). b. Input work order number.	4.1 Understanding sequential relationships. 4.2 Following procedural directions. 4.3 Keyboarding numbers.
5. Check screen documentation against paper documentation.	5.1 Cross referencing.
6. Prepare machine. a. Clear channels of left over parts. b. Check for correct polarity in tubes. c. Check for mini-DIPS to handload or have magazine adjusted. d. Load tubes from bins into channels, matching bin and channel numbers. (If shorted on parts, check set-up sheet for part number, retrieve missing tubes from remote stock.) e. Refill low channels (initially and as needed during run).	6.1 Visual discrimination. 6.2 Matching numbers. 6.3 Applying preventative measures. 6.4 Reading 2-column charts.
7. Position board on fixture according to manual documentation. a. If no documentation, step through machine for positioning.	7.1 Interpreting schematics. 7.2 Applying technical knowledge (to troubleshoot).

JOB TASKS	SKILLS
8. Run DIP machine. a. Zero out machine. b. Position table. c. Check that "limit" light is off. d. Check that "head" lights are on. e. Push "start".	8.1 Following procedural directions. 8.2 Using common knowledge for safety.
9. Troubleshoot solution if machine turns off or stops. a. Check switches, lights, BEC. b. Look for jammed parts. c. Call tech if indicated (communicate with tech about problems and operator's role in problem resolution).	9.1 Determining presence of a defect. 9.2 Interpreting sounds and signals. 9.3 Detecting abnormalities in processes. 9.4 Selecting appropriate course of action. 9.5 Communicating clearly. 9.6 Summarizing essential details.
10. Remove board and insert new board as in steps 7 through 9.	10.1 Following procedural directions. 10.2 Understanding temporal relationships.
11. Inspect each board for: a. Correct part number (against manual documentation). b. Correct part positions (against manual documentation). c. Missing parts (against manual documentation). d. Polarity (notches, squares, holes). e. Bent leads (visual check in light).	11.1 Visual discrimination. 11.2 Interpreting drawings for assembly. 11.3 Matching numbers. 11.4 Identifying details, labels, numbers. 11.5 Applying preventative measures. 11.6 Identifying trends from failures.
12. Repair board if error. a. Decide to repair part (consider affect of repaired part on board) or, b. Decide to scrap part and replace: • Record part number and number of parts in scrap record book (using set up sheet). • Get new part from remote stock. c. Handload correct part. d. Record error with soft keys on program according to on-screen directions. e. Recheck & repair as in steps 11 through 12.	12.1 Determining the extent of damage. 12.2 Understanding cause and effect relationship. 12.3 Recording essential information. 12.4 Interpreting drawings for assembly. 12.5 Interpreting codes.
13. Count number of boards completed and stop run at correct number.	13.1 Numerical discrimination.
14. Complete work order procedures. a. Load boards onto WEZ TOTE with WEZ TOTE tag attached. b. Fill out queue card with name and number of boards flowed. c. Type "D" for done on system. d. Route to next station according to on-screen directions. e. File set-up sheet.	14.1 Entering appropriate information onto a form. 14.2 Following procedural instructions. 14.3 Filing forms.

JOB TASKS

15. Work as team with other operators.
- a. Be aware of bottlenecks.
- b. Pitch in at other machines as needed.
- c. Leave notes for next shift if particular problems need communicating.
- d. Work together with up and downstream operators on hot boards.

SKILLS

15.1 Predicting process problems.
15.2 Analyzing cause and effect.
15.3 Synthesizing information to determine best course of action.
15.4 Communicating clearly about problems/solutions.
15.5 Applying group decision-making procedures.
15.6 Prioritizing actions.
15.7 Writing brief, descriptive accounts.
15.8 Summarizing essential details.

Workplace Applications of Basic Skills

A National Workplace Skills Project

in cooperation with

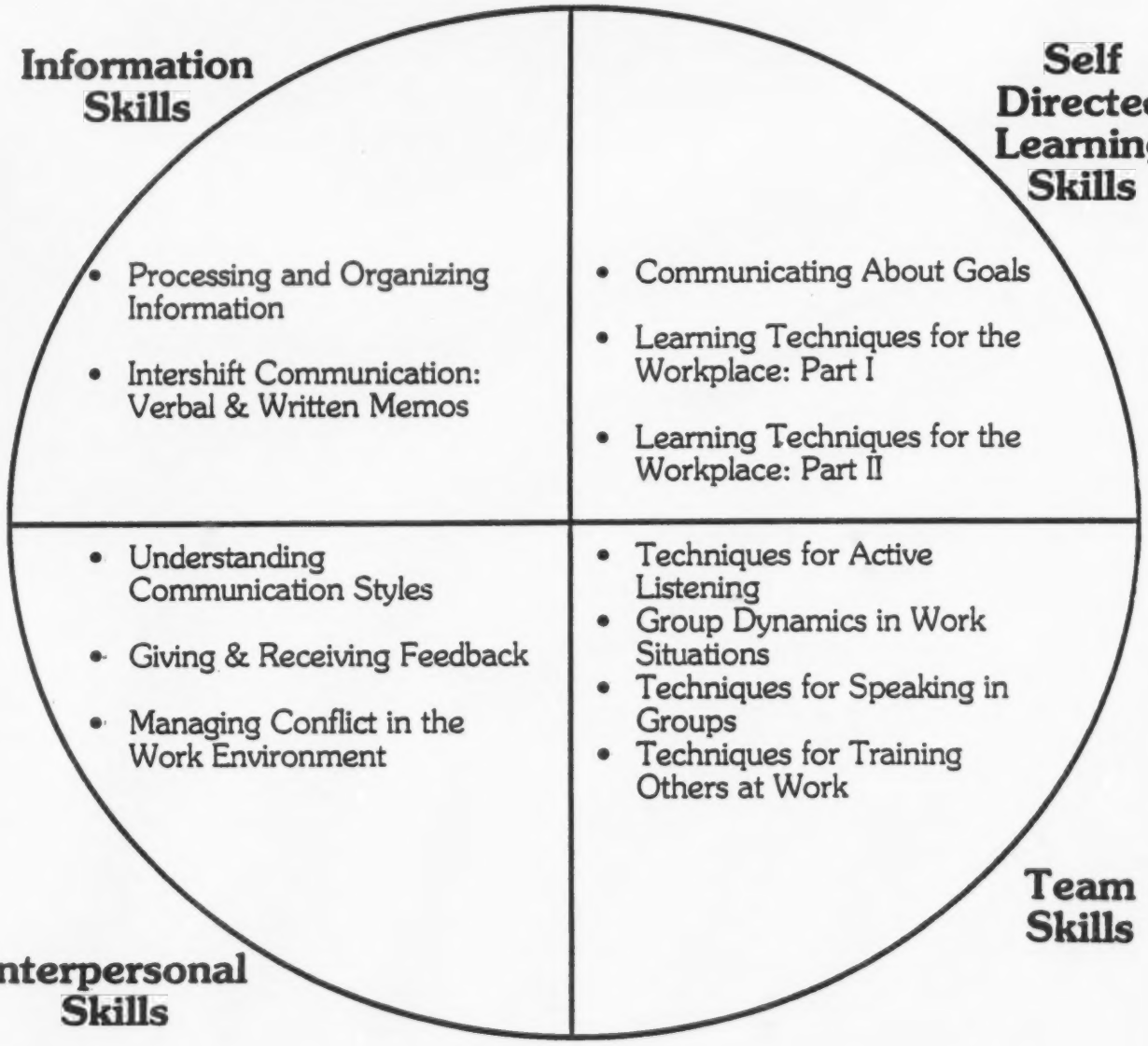
Hewlett- Packard, Fort Collins Site

Curriculum Outline

HO1.0

Strategic Workplace Skills:

Oral & Written Communication Course Overview


Information Skills
• Processing and Organizing Information
• Intershift Communication: Verbal & Written Memos
Self Directed Learning Skills
• Communicating About Goals
• Learning Techniques for the Workplace: Part I
• Learning Techniques for the Workplace: Part II
Interpersonal Skills
• Understanding Communication Styles
• Giving & Receiving Feedback
• Managing Conflict in the Work Environment
Team Skills
• Techniques for Active Listening
• Group Dynamics in Work Situations
• Techniques for Speaking in Groups
• Techniques for Training Others at Work

Unit 1: **Strategic Workplace Skills**
Oral and Written Communication...
A Course Review

Unit Overview:

Goal of Instruction: To begin to develop a group identity in order to provide a safe, enjoyable environment for learning and growth; to give an overview of the entire course; to self-assess communication skills; to administer a content assessment.

Learning Objectives:

Learners will be able to:

- **state their expectations for the course**
- **begin developing a group identity**
- **identify the components of the course and requirements for certification**
- **identify how they feel about their communication skills**
- **identify the reasons for clearing/focusing techniques**

Unit 2: Processing and Organizing Information

Unit Overview:

Goal of Instruction: The learner will learn to prioritize and process information transfer, both oral and written, as it applies to the HP CCMO workplace.

Learning Objectives:

Learners will be able to:

- identify skills needed to prioritize and organize the diversity of workplace specific information
- practice prioritizing skills in functional context
- identify oral communication skills used in processing workplace communication
- practice identified oral communication skills
- identify written communication skills used in processing workplace communication
- practice identified written skills

Unit 3: Inter Shift Communication: Verbal and Written Memos

Unit Overview:

Goal of Instruction: To learn how to communicate orally and in writing between shifts, making the communication relevant, logically-organized and complete.

Learning Objectives:

Learners will be able to:

- **evaluate a written communication for clarity**
- **describe a work situation clearly and thoroughly**
- **identify key ideas and supporting details for communication**
- **select relevant information**
- **write a descriptive account of workplace activities/problems**
- **organize verbal and written communication in a logical or prioritized order**
- **include essential components in an intershift memo**

Unit 4: Communicating About Goals

Unit Overview:

Goal of Instruction: The learner will be able to communicate their employment goals from a position of maximum personal preparedness and will be able to access the information needed to pursue their goals.

Learning Objectives:

Learners will be able to:

- **identify types of power**
- **identify and articulate their skills/abilities**
- **identify employment goals**
- **create a development plan with their supervisors**
- **practice strong and positive ways to communicate their skills, abilities, goals and need for information**

Unit 5: Learning Techniques for the Workplace Part I

Learning Objectives:

Learners will:

- understand the differences between pedagogical learning and self-directed lifelong learning
- discover their own learning style preference
- be able to set learning goals with appropriate objectives
- learn to use the learning contract method
- write and carry out an individual learning contract

Unit 7: Understanding Communication Styles

Unit Overview:

Goal of Instruction: To identify three different communication styles that people use and practice using the assertive style.

Learning Objectives:

Learners will be able to:

- **Identify three styles of communication.**
- **Discuss advantages of the assertive style.**
- **Experience success in using assertive communication techniques.**

Unit 8: Giving and Receiving Feedback

Unit Overview:

Goal of Instruction: To identify effective and ineffective methods of giving and receiving feedback. To plan for and practice giving feedback using effective methods.

Learning Objectives:

Learners will be able to:

- **participate in an exercise emphasizing self-disclosure and feedback.**
- **compare effective with less effective behaviors associated with giving feedback.**
- **practice giving and receiving feedback using effective feedback techniques.**

Unit 9: Managing Conflict in the Work Environment/Review Learning Contract

Unit Overview:

Goal of Instruction: To give workers some alternative methods for dealing with conflict. To help workers identify appropriate use of conflict management tools.

Learning Objectives:

At the end of this session, learners will be able to:

- **identify five conflict styles**
- **identify the most effective style to dealing with specific conflict situations**
- **identify and use the steps for collaborative conflict management**

Unit 10: Learning Techniques for Active Listening

Unit Overview:

Goal of Instruction: The learner will understand the impact of listening to on-the-job communication and will increase ability to actively listen.

Learning Objectives:

Learners will:

- **explore the skills and barriers related to good listening**
- **assess their own listening skills**
- **practice active listening skills**
- **apply active listening to workplace communication**

Unit 11: Group Dynamics for Manufacturing Operators

Learning Objectives:

Goal of Instruction: The learner will understand th e process of effective group work and be able to identify roles that people play in groups.

Learners will be able to:

- **focus on the task at hand by using a simple technique**
- **define a group, define a team, and distinguish between a group and a team**
- **identify and experience some task behaviors in groups**
- **identify and experience some maintenance behaviors in groups**
- **compare effectiveness of various roles**

Unit 12: Techniques for Speaking in Groups

Learning Objectives:

Goal of Instruction: The learners will receive specific steps and techniques they can use when presenting information in groups.

Learners will be able to:

- **identify some effective group behaviors**
- **plan their presentation presence**
- **recognize segments of well-organized information**
- **practice speaking in groups**
- **summarize effective use of humor in groups**

Unit 13: Techniques for Training Others at Work

Learning Objectives:

The learner will learn a systematic approach to training and learning new skills at work.

Learners will be able to:

- **recall several warm-up activities to precede training**
- **recognize the importance of essential information**
- **recall and practice five steps for teaching or learning a skill**
- **describe job aids and their use for training others**
- **write a job aid**

Unit 14: Commitment to Communicate

Unit Overview:

Goal of Instruction: To review course content and evaluate the effect of training on communication strategies. To cement the commitment to continued learning and integration of skills acquired to the job.

Learning Objectives:

Learners will be able to:

- **recall skills and activities covered in the course**
- **assess effect of training on personal communication strategies**
- **evaluate personal progress toward communication improvement contracts**
- **confirm course follow-up and integration plans**